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TITLE: SEMICONDUCTOR SOLID-STATE IMAGE PICKUP DEVICE

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ABSTRACT:

PURPOSE: To obtain the perfect airtightness by subjecting a seal ring part of a window metallic frame to seam welding to stick a glass plate to the window part whose edge is bent into L-shape to enable the sealing of low temperature such that a filter is not deteriorated.

CONSTITUTION: In a lamination ceramic body 1, a metallic layer 12 is arranged at the bottom of a recess, and a sealing part 9 on an upper surface of the circumferential part and an external lead 14 on the side plane are arranged. A chip 2 of a solid body image pickup device is bonded on the

metallic layer 12 by an adhesive 13 and a filter 4 is bonded to the upper surface of chip 2 through an adhesive layer 3. Meanwhile, in a metallic frame 15 of window-frame form of a cap 8, the edge of the window part is bent into L-shape and a transparent glass plate 6 is stuck through a low-melting-point glass 7. Then the package base and the cap 8 are overlapped and the overlapped part of the frame 15 and the seal ring part 9 is sealed by welding with a seam welder.

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Specification

1. Title of Invention

Semiconductor Solid Image Pick-up Device

2. Claim

A semiconductor solid image pick-up device, characterized by being comprised of the following components: a package base that supports a solid image pick-up device and that has a seal ring section; a window frame like metal frame that is seam-welded to the seal ring section and in that a glass sheet is fixed in a window whose rim is bent into an L shape.

3. Detailed Description of the Invention

[Field of Industrial Application]

This invention pertains to semiconductor solid image pick-up devices such as charge coupling devices (CCDs). In particular, this invention relates to semiconductor solid image pick-up devices that use ceramic packages.

[Prior Art]

Solid image pick-up devices usually need to be protected by shielding them from an outer atmosphere so as to improve the reliability. However, when filters of the semiconductor solid image pick-up devices are heated to high temperatures, they deteriorate. Due to this problem, during a bonding of package bases and transparent glass sheets, it is difficult to obtain a complete airtight sealing using glass for the sealing materials. In order to improve the situation, organic adhesives are used. It results in an insufficient air-tightness. A strict reliability test cannot be conducted.

[Purpose of the Invention]

The purpose of the invention is to offer a semiconductor solid image pick-up device that can perform a low temperature sealing at a degree wherein a filter does not deteriorate and obtain a complete air-tightness.

[Constitution of the Invention]

The semiconductor solid image pick-up device of the invention is comprised of the following components: a package base that supports a solid image pick-up device and that has a seal ring section; a window frame like metal frame that is seam-welded to the seal ring section and in that a glass sheet is fixed in a window whose rim is bent into an L shape.

[Effect of the Invention]

Since the sealing process is performed by the seam-welding means, the semiconductor solid image pick-up device of the invention is completely sealed so as to

maintain a semiconductor chip at a low temperature at 120 to 130°C or lower. Because the periphery of the window of the window frame like metal frame is bent in the L shape, the mechanical strength to the outer pressure can be sufficiently maintained. Thus, the air-tightness of the semiconductor solid image puck-up device improves.

[Embodiment]

The embodiment of the invention is described hereinbelow with reference to the drawing.

Fig.1 is a cross-sectional view illustrating a semiconductor solid image pick-up device as in an embodiment of the invention. A package base provides the following components at the following locations: a tungsten-nickel-gold layer 12 provided on the bottom of a recess of a laminate ceramic article 1 formed by laminating and sintering ceramic sheets; a seal ring section 9 provided on the upper surface around laminate ceramic article 1, which is made of a gold-tin alloy; an outer lead 14 provided on the side surface. A chip 2 of a solid image pick-up device such as a CCD is adhered on metal layer 12 by applying an adhesive 13 such as a silver (Ag) paste. A filter 4 is adhered on the upper surface of chip 2 via a proper adhesive layer 3. A fine metal wire 5 is wired so as to electrically connect chip 2 and outer lead 14. As filter 4 does not have any heat resistance, it is necessary to apply a sealing process at a low temperature.

A window frame like metal frame 15 of a cap 8 is bent so that the location around the window opened at the center has a step. A transparent glass surface sheet 6 such as sapphire glass or cobalt glass is fixed on a glass attaching surface one step lower via lower melting point glass 7. Furthermore, a nickel (Ni) plating or a tin (Sn) plating is

applied onto the entire surface of cap 8 except for transparent glass surface sheet 6 and lower melting point glass 7. As a rim 10 on the glass attaching surface of window frame like metal frame 15 has a L-shaped structure, the mechanical strength to the outer pressure is sufficiently maintained. The air-tightness of the semiconductor solid image pick-up device is also ensured.

The package base as structured above and cap 8 are overlapped each other. Using a seam welder, the overlapping section between metal frame 15 and seal ring section 9 are sealed by a welding means. Fig.1 illustrates a welding roller electrode section 11 of a seam welder by a dashed line (the other electrode is also located almost symmetrically; as not shown in the drawing). The heat generated during the seam welding is conducted to chip 2 of the solid image pick-up device and filter 4 at an only small amount. Filter 4 will not deteriorate due to the heat.

[Advantageous Result of the Invention]

The semiconductor solid image pick-up device of the invention demonstrate the following advantages without giving any heat charge to it, particularly the filter, by sealing the window frame like metal frame by a welding means and by bending it into an L shape: an improved optical yield; maintenance of the mechanical strength of the cap; sufficient air-tightness.

4. Brief Description of the Invention

Fig.1 is a cross-sectional view illustrating a semiconductor solid image pick-up device as in an embodiment of the invention.

1...Laminate ceramic article

2...Chip

4...Filter

6...Transparent glass surface sheet

8...Cap

9...Seal ring section

11...Welding roller electrode

Translations Branch
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